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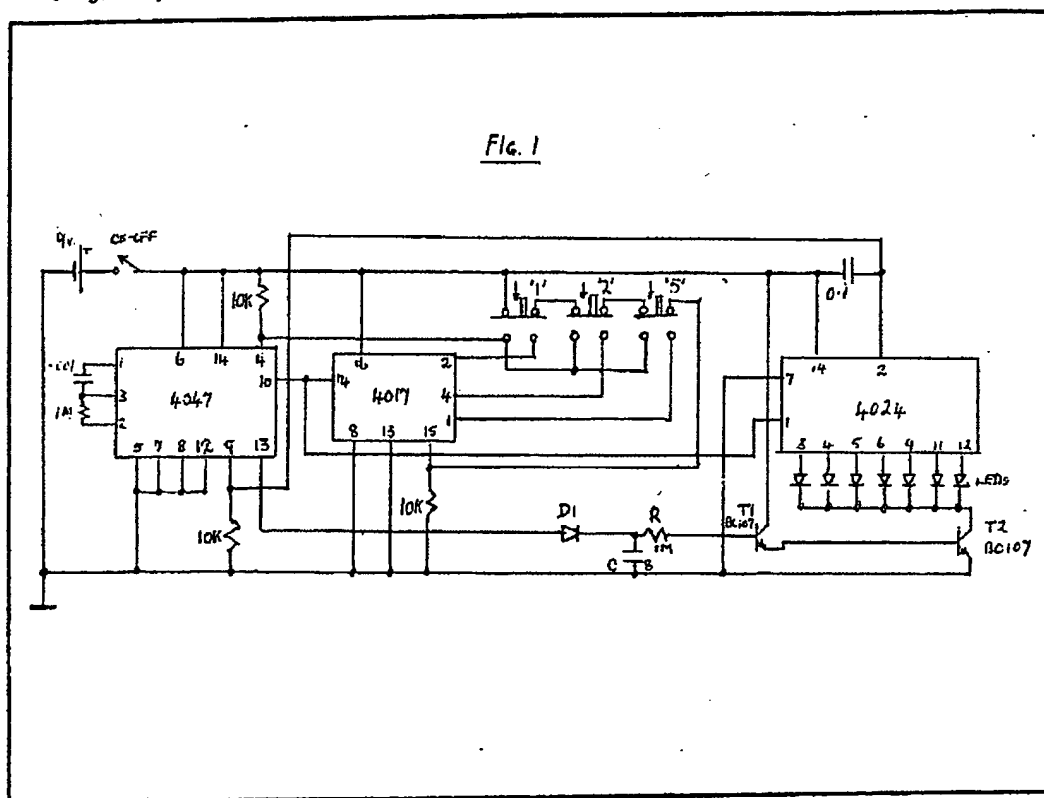
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(54) Adding Device

(57) A device suitable e.g. for stock control by paraffin retailers consists of a circuit arrangement for instantaneous addition and recording of selected integers, with arrangements for resetting to zero

count at switching on, and with gradual turn off of the L.E.D. display with a view to battery economy when switched on for continuous recording for long periods (e.g. a month). Further applications of the basic idea are in game scorers or investigative recorders.

Fig. 1



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Fig. 1

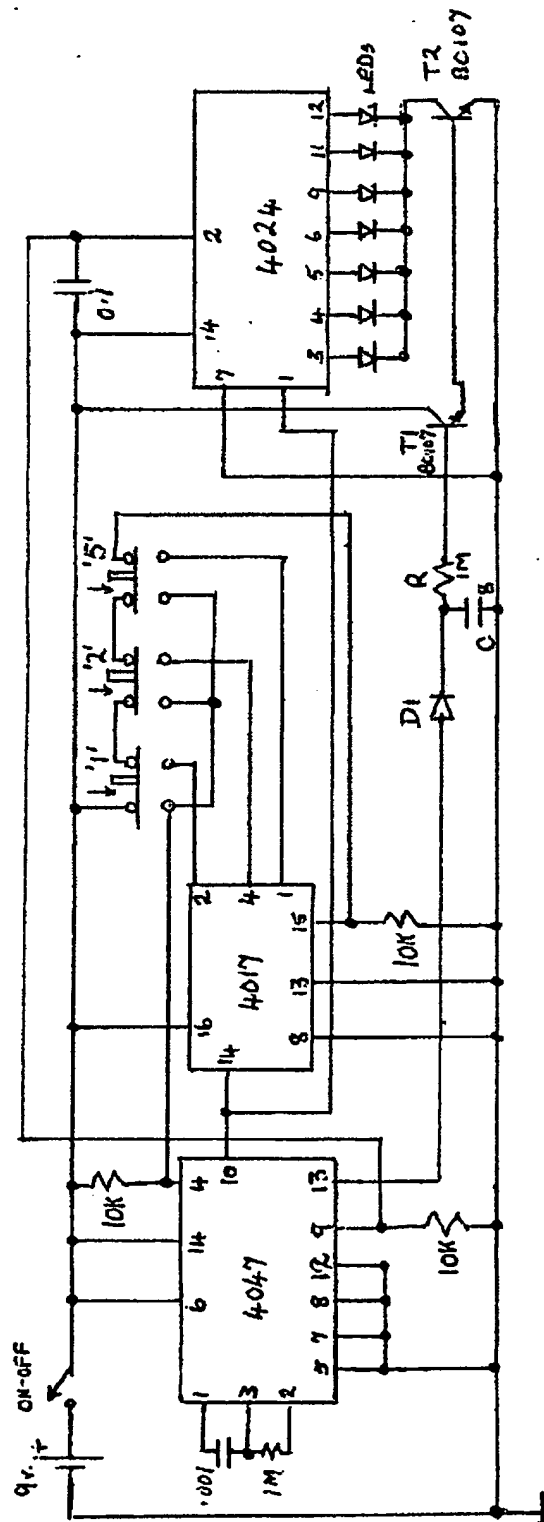
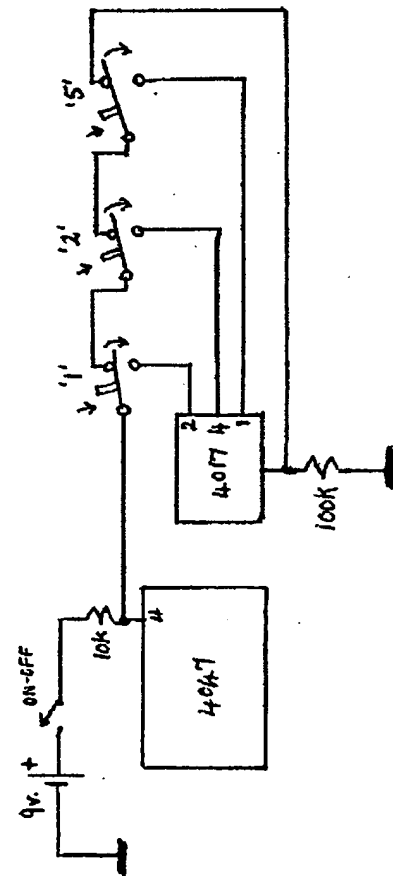


Fig. 2



## SPECIFICATION

## Current-economy Counter-recorder

Fur use by small retailers such as those in paraffin shops, the invention consists of a small battery-operated, or economical mains operated, counter recorder, giving an instantaneous record of total of goods sold, variable instantaneously by any one of a number of integers on pressing an appropriate microswitch, with a circuit for automatic inhibition of the display after a brief interval following the last recorded sale, whilst retaining the total quiescently for later display (including the latest addition) at any subsequent sale.

## 15 Essentials of the invention are:—

(1) An arrangement of integrated circuits, including a multivibrator and two counters, giving a final count between two suitable numbers, and an arrangement of microswitches for initiating instantaneous addition of selected integers, with a light-emitting display.

(2) An additional circuit run from one of the multivibrator outputs to turn off the display gradually after a chosen interval, duration of this interval being selectable by choice of the value of a capacitor.

(3) An arrangement of the integrated circuit connections so that the displayed count is at zero, and the display quiescent, when the ON-OFF switch is switched on.

One embodiment of the invention is a 0 to 127 counter with an ON-OFF switch with resetting and initial quiescence facility, and microswitches for addition of 1, 2 or 5 items sold, battery-operated from a 9 volt battery at an average current of 0.7 mA, with an inhibiting circuit producing quiescence of the display at about 30 seconds after the operation of any microswitch. The arrangement is sufficiently simple to have been incorporated, including battery, in a 100x70x40 mm box. A circuit of this embodiment is attached, (Fig. 1).

Working of this circuit is as follows:—

The C-MOS integrated circuits include a 4047 multivibrator, 4017 scale of 10 counter, and 4024 7-stage scale of 2 counter. Closure of the ON-OFF switch applies the positive of the 9 v. battery to the appropriate terminals of these circuits, and also a positive disturbance through the 0.1 microfarad capacitor to 2 (RESET) of 4024 and 9 (EXT. RESET) of 4047, which terminals are tied to ground via a 10 k. Meanwhile 15 (RESET) of the 4017 is initially connected to HIGH (the positive of the battery) through the upper terminals of the three microswitches, while 4 (ASTABLE) of 4047 is connected to HIGH through a 10 k. On depressing one of the microswitches, say '5', 15 of 4017 is disconnected from HIGH and falls to LOW (the negative of the battery, i.e. ground) through operation of the 10 k tying 15 to ground. At the same time, 4 of 4047 is connected to 1 of 4017, making it LOW, and the 4047 multivibrates until

OUTPUT 10 (the  $\frac{1}{2}$  frequency output Q), which is applied to inputs 14 of 4017 and 1 of 4024 has given 5 HIGHS, whereupon 1 of 4017 becomes HIGH, which through application to 4 (ASTABLE) of 4047, stops the multivibrator.

Normal output 13 of 4047 (at full frequency) is applied through diode D1 to transistors T1 and T2, the latter of which is connected in series with the LED display, causing the appropriate LEDs to light up for an interval determined by capacitor C and resistor R. After this interval, the LEDs go out, but so long as the ON-OFF switch is at ON the 4024 continues to function, recording the total count, which is then displayed (including the latest addition) on any subsequent depression of any one of the three microswitches.

Claims include incorporation of a circuit similar to the above in some larger integrated circuit or device.

A different switch arrangement, using single pole double throw microswitches, is also claimed (Fig. 2). Automatic inhibition of a light emitting display after a brief interval, in its application to other devices, is also claimed.

## Claims

1. An arrangement of components initiating comparatively fast or instantaneous addition and recording of the sum of selected integers.

2. An arrangement, as claimed in claim 1, with a light-emitting diode display, and an arrangement of circuit connections so that the original count is at zero, and the display quiescent, when the ON-OFF switch is switched on.

3. An arrangement, as claimed in claim 1, with a light-emitting diode display and an additional circuit to turn off the display gradually after a chosen interval.

4. An arrangement, as claimed in claim 1, run from a battery, and using a current economy arrangement so that it can be left switched on for very long periods (e.g. a month) without battery replacement, continuously recording.

5. An arrangement, as claimed in claim 1, or claims 1, 2, 3, 4, especially designed as an aid in stock control for retailers, or in paraffin control for paraffin retailers.

6. An arrangement, as claimed in claim 1, with provision for making two or more summations for the purpose of recording scores obtained in competitions, pastimes, sports or games, or for the prosecution of investigative work.

7. An arrangement, as claimed in claim 1, operated by press-button switches.

8. An arrangement, as claimed in claim 1, with its operation initiated by an optical or acoustic device instead of switches.

9. An arrangement of components for automatically inhibiting a light-emitting diode display after a brief interval, for the purpose of battery current economy.

10. Incorporation of a circuit arrangement with the properties claimed in claims 1 or 9, in some more comprehensive integrated circuit or device.

New Claims or Amendments to Claims filed on 18 Feb. 1981.  
Superseded Claims 1—10.

#### New or Amended Claims

- 5 1. An arrangement of components containing two electronic counters, which arrangement can be battery-operated and which, upon a single stroke of one actuating element such as a microswitch, without necessity for pulse-shaping or transient removal circuits, and using standard integrated circuits initiates the operation of an electronic multivibrator or equivalent pulse generator, the number of pulses from which is counted until a predetermined number, which can be one or greater, is reached, whereupon the multivibrator is automatically stopped by the first counter output, and this counter is automatically reset, the number of pulses being also counted by a second counter which is not reset, except on switching OFF, but remains operating throughout the time during which the battery is switched on, and serves as a register of the total sum which is displayed upon a series of light-emitting diodes, which light up for a brief interval following upon the previously mentioned stroke of the actuator, and after this interval become quiescent, saving battery power, until the next stroke of the activating element, or of any additional activating element associated with any alternative number to be added.
- 20 2. An arrangement as claimed in claim 1, with an arrangement of the circuit connections so that the original count automatically becomes zero and the display quiescent, when the ON-OFF switch is switched on.
- 25 3. An arrangement as claimed in claims 1 or 2, except that it is mains-operated and with or without provision for rendering the light-emitting diodes quiescent when not required to display the total sum.
- 40 4. An arrangement as claimed in claims 1 to 3, except that one or more of the integrated circuits are replaced by transistor devices, or other integrated circuits, the operation of which is equivalent to that of the arrangement claimed in claim 1, or with additional counters, multivibrators or displays incorporated without altering the essential principle of operation claimed in claim 1.
- 45 5. An arrangement as claimed in any one of the preceding claims but in which one or more of the components are collected together in the form of some more comprehensive integrated circuit, operation of which is equivalent to that of the arrangement claimed in claim 1, or any following claim.
- 50 6. An arrangement as claimed in any one of the preceding claims, but with some other method of display in place of light-emitting diodes.
- 55 7. An arrangement as claimed in any one of the preceding claims, but with its operation initiated by an actuator such as an optical or acoustic device in place of a switch.
- 60 8. An arrangement as claimed in any one of the preceding claims, especially designed as an aid in stock control for retailers.
- 65 9. An arrangement, as claimed in any one of the preceding claims, with provision for making two or more summations at different times, each of which when considered separately is initiated by a single stroke of an actuating element, and using if necessary two or more displays to show the results of two or more summations, for the purpose of recording scores obtained in competitions, pastimes, sports or games, for the prosecution of investigative work, or for recording two or more items on a stock list, notwithstanding possible economies of operation achieved through using parts of the arrangement of any one of the preceding claims, in common with the arrangement for obtaining the additional summation or summations.
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